

## Technical Challenges

Implementing a clinical decision support system comes with a unique set of technical, social, and medical challenges.



Adapting our technical approach to the rapidly changing data available and medical context surrounding COVID-19



Developing robust machine learning algorithms to provide advanced, intelligent decision support for clinicians



Displaying data from NHS servers on mobile and tablet devices at the patient bedside

## Impact and Commercial Viability

*Our EPIC IMPOC module is one of the first planned to undergo clinical trials in the NHS, starting in early July 2020.* With a second wave looming in autumn, our solution would be a crucial part of the Imperial College Healthcare NHS Trust's COVID-19 response. The Trust's 5 hospitals currently treat more than 1.125 million patients and employ 11,800 people annually. Using clinical data from hospitals, our solution can improve case diagnosis speed, accuracy and risk assessment both for these patients and medical care workers, while decreasing screening costs in the coming uncertain months.

*Please do not hesitate to contact us if you any questions or enquiries @ Dept. of Electrical and Electronic Engineering, Imperial College London.*

# EPIC IMPOC COVID-19 DECISION SUPPORT MODULE

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## Everyone's heard about COVID-19

The first case of COVID-19 was detected in Wuhan, China on December 31st, 2019. Soon thereafter, the WHO characterized the viral disease as a pandemic because of its alarming levels of spread and severity. With the UK's ever-increasing death toll and number infected, the government imposed the lockdown on March 23rd 2020. The country has since shut down economically and socially to protect the NHS from being overwhelmed and limit the spread of the disease.

So far we have been quarantining for approximately 70 days. That is equivalent to 1680 hours, 100800 minutes, 6,048,000 seconds.

### That's enough time to

-  Travel to the moon 23x
-  Play Queen's Greatest hits 1720x

-  Fly around the world 37x
-  Watch Titanic 516x

According to the NHS, as of Saturday 23rd May, there have been

# 257,154

Total lab-confirmed cases

# 2,959

Daily lab-confirmed cases

# 36,675

Total associated deaths

# 282

Daily associated deaths

## Problem Description

There is an ever-growing need for health care professionals to diagnose and treat patients with infectious diseases as quickly as possible. With the strain put on the NHS under current conditions, there is an urgent need for better hospital resource allocation.

EPIC IMPOC (Enhanced, Personalised and Integrated Care for Infection Management at the Point of Care) is a clinical decision support system used in the NHS to improve the management of infectious diseases by facilitating data collection, infection diagnostics and antimicrobial therapy advice.

## Our Goal

In the midst of the SARS-CoV-2 outbreak, we implemented a new module in EPIC IMPOC, specifically to provide aid to clinicians by improving patient management and diagnosis.

*Our objective is to identify biomarkers and develop algorithms to assess the presence and severity of COVID-19 based on the pathology and electronic health records. This will allow medical experts to prioritize treatment for more vulnerable patients and improve the distribution of medical resources.*

## Technical Solution

The EPIC IMPOC COVID module uses machine learning algorithms specifically tuned to optimise probabilistic inference for the detection and risk assessment of COVID-19 patients.



Packaged in a mobile and desktop friendly panel for clinicians within EPIC IMPOC, our Case Based Reasoning system identifies patients with similar severity levels, symptoms, and medical histories in the UK.